

Work Order ID 72995

Tuesday, August 23, 2011 10:07:30 AM



Page 1

Item ID: D205-634-041

Accept



Setup Start



Revision ID:

Stop



Item Name: Replacement Skidtube

Start Date: 8/23/2011 Start Qty: 1.00



Cust Item ID:

Required Date: 8/31/2011 Req'd Qty: 1.00



Customer:

Reference:

Approvals:

Process Plan:

Date: 11-08-23

Tooling:

Date:

Run Start



QC:

Date:

SPC (Y/N):

Date:

Stop



Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Tool ID

Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

Draw Nbr

Revision Nbr

D2580-041

Rev.D DEO-D1

100

0.00



DOCUMENT CONTROL

DC

Memo

0.00

Document Control

Photocopy D205-634 bluefile & type labels per PPP D205-634-041 CHG002

MA

110

0.00



BENDING MACHINE - SKIDTUBES

CNC Bend 1

Memo

0.00

CNC Delta 100 Bender

1-Bend as per program D2580.C on CNC Bender and Folio 16

2-Cut tubes as per Dwg. D2580

3- scribe batch# in aft end of tube

Handwritten signature/initials

11-9-13

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Stop



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
120		0.00							
Skidtubes	Memo	0.00							
Skidtubes	1- Deburr ends and remove bending marks								
	2- Prepare tube for welding as per QSI 004								
130	QCS- Inspect part completeness to step on W/O	0.00							
QC	Memo	0.00							
Quality Control									

DL

11/09/14

1 0 2E-11/10/05

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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Run Start



Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Stop



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Sequence ID/
Work Center ID

Operation ---
Description

Set Up/
Run Hours

Tool ID

Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

140

0.00



Skidtubes

Skidtubes

Memo

0.00

1-Weld step D2576 as per Dwg. D2580 and QSI004
A/R [] Aluminum Rod

ml10736 BE 11/10/05

2-Grind welds on step as per Dwg D2580

3-Weld spacers as per dwg D2580

BE 11/10/05

3- *** N/A**** Insert D4202-1 spacer, swage as per QSI002 and trim/ grind
flush per QSI002 and dwg. Hold x-bolt with DT9701 Use tube expander 1/2
x17G to start expansion and finish with 1/2 x 18G to achieve dwg dimension.

Grind Dh 11/10/06

4-Drill holes for wearplates using DT 8217 & DT8937 Open holes to 19/64",
adjust stopper not to hit web. Deburr

} Dh 11/10/06

6-Drill pilot holes for aft cap using DT 8215 Open holes to 0.208". Deburr

7-Drill pilot holes for Tow ring using DT8091, open to .640" and Deburr

+ C-Bore > DD 11-10-11

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Date:

Tooling:

Date:

Stop



QC:

Date:

SPC (Y/N):

Date:

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

150

QC10- Inspect visual per QSI004- ground welds

0.00



QC

Memo

0.00

Quality Control

Sulco 11/3

160

QC5- Inspect part completeness to step on W/O

0.00



QC

Memo

0.00

Quality Control

Sulco 11/3

170

Pressure Wash per QSI005 4.3

0.00



HandFinish

Memo

0.00

Hand Finishing

Re-alodine tube as per QSI 005 section 4.1.2.1 do not acid etch and leave fwd cap out of solution.

IX Ø M-L 11/10/13

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Process Plan:

Date:

Tooling:

Date:

Stop



QC:

Date:

SPC (Y/N):

Date:

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Tool ID

Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

180

White Gloss(Ref:4.3.5.1) per QSI005 4.3-Alum

0.00



Powdercoat

Powder Coating

Memo

START TIME:

OVEN TEMPERATURE:

FINISH TIME:

4:00
320 OF
4:30

HC M/L 11/10/13

190

QC3- Inspect Part Finish

0.00



QC

Quality Control

Memo

0.00

1 BR 11-10-18.

Dart Aerospace Ltd

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Stop



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Tool ID

Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

200

0.00



HandFinish

0.00

Hand Finishing

Memo

1-Install inserts & wearplates & Gaskets as per Dwg. D2580. Use a drop of Sikaflex on insert holes before installing wearplates
A/R ☐ ☐ ☐ Sikaflex-291 ☐ 118393 ☐ ☐
Sikaflex expire date: 12-5

2-Coat D2594-3 O' rings with Petroleum Jelly and install on D2594-1 plugs as per Dwg D2580

3-Inspect for foreign object per QSI 024

4-Install 2855 Aft Cap as per Dwg D2580 and seal Fwd Step & Aft Cap with Sikaflex. Clean excess adhesive
A/R ☐ ☐ ☐ Sikaflex-291 ☐ 118393 ☐ ☐
Sikaflex expire date: 12-5

5-Wing Walk as per Dwg D2580 and QSI 005 4.4
Batch: M. 118488

1 BL 11-10-18

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Required Date: 8/31/2011 Req'd Qty: 1.00



Customer:

Reference:

Run Start



Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
210	QC5- Inspect part completeness to step on W/O	0.00							
QC		0.00							
Quality Control	Memo Inspect Aft Cap, Fwd Step and Wing Walk of work to Current Step Inspect for Foreign objects per QSI 024								
220	Packaging	0.00							
Packaging		0.00							
Packaging	Memo Identify and pack for shipping as per PPPD205-634-041 Location: PPP Rev: <u>PPD 7396</u>								
230	QC21- Final Inspection - Work Order Release	0.00							
QC		0.00							
Quality Control	Memo								

S uls/19

②

Rec'd 10/17/10

11/10/2010

mf

11-10-19

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W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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Page 1

Parent Item: D205-634-041

Parent Item Name: Replacement Skidtube




Start Date: 8/23/2011

Required Date: 8/31/2011

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP Rev:N 02.08.28 FP was QC5 in Step 27; Added QC5 to Step 30
KJ IPP Rev P 10.02.19
per PAR09-043 EC verified by:DD
IPP Rev. O 06.02.28 Added paperwork EC
IPP Rev:P 07-07-09 SS Wearplates & Gaskets JLM IPP Rev:Q
10.12.01 as per chg003 DD verf:EC

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D4202-1  Spacer	D2579	Manufactured	No			140	Each	443.0000	20	20		BE 11/10/05 B73751 x20 11-9-13	
				<u>Location</u>				<u>Loc Qty</u>			<u>Loc Code</u>		
				LG000				443					
				66929				106					
				67129				196					
				67308				1					
				67430				140					
D2580-1  205 Skidtube bent detail		Manufactured	No			110	Each	6.0000	1	1		11-9-13	
				<u>Location</u>				<u>Loc Qty</u>			<u>Loc Code</u>		
				LG				6					
				72840				6					
D2576-3  Step (maching detail)		Manufactured	No			140	Each	29.0000	1	1		BE 11/10/05	
				<u>Location</u>				<u>Loc Qty</u>			<u>Loc Code</u>		
				LG				29					
				66156				29					

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Picklist Print

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Work Order ID: 72995

Parent Item: D205-634-041

Parent Item Name: Replacement Skidtube

Start Date: 8/23/2011

Required Date: 8/31/2011

Start Qty: 1.00

Required Qty: 1.00

D2855

Manufactured No

200

Each

29.0000

1

1



Cap



BR 11-10-18.

Location

Loc Qty

Loc Code

FP007

29

65519

2

65569 ✓

27

AN3-5A

Purchased No

200

Each

1,031.000

2

2



Bolt



BR 11-10-18.

Location

Loc Qty

Loc Code

ST350

1031

115371

46

117423 ✓

685

118626

300

AN960JD10L

NAS1149D0332J Purchased

No

200

Each

0.0000

2

2



Washer



2.

BR 11-10-18.

ALS7-1032-130

Purchased

No

200

Each

1,155.000

50

50



Insert



BR 11-10-18.

Location

Loc Qty

Loc Code

ST282

1155

117717

899

118386

256

50.

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Shop Packet Print

Page 2

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Parent Item Name: Replacement Skidtube

Start Date: 8/23/2011

Required Date: 8/31/2011

Start Qty: 1.00

Required Qty: 1.00

AN3C4A Purchased No 200 Each 2,391.000 50 50



BOLT



BL 11-18-18.

Location Loc Qty Loc Code

ST350	2391	
117313	2	
117688	36	
117795	1	
117872	22	
118012	20	
118112	40	
118451 ✓	1000	
118628	1270	

* AN960C10L NAS1149C0332 ✓ Purchased No



washer

D3566-13

Manufactured No



Gasket

200 Each 0.0000 50 50

118354.



50

BL 11-18-18.

Location Loc Qty Loc Code

FP	5	
69281	5	
FP014	19	
68341	1	
72149 ✓	18	



1

BL 11-10-18.

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Parent Item Name: Replacement Skidtube

Start Date: 8/23/2011

Required Date: 8/31/2011

Start Qty: 1.00

Required Qty: 1.00

D3566-5 Manufactured No

200 Each

23.0000

1 1



Gasket



BR 11-10-18.

Location

Loc Qty

Loc Code

FP015

23

68961

1

71601

2

72849 ✓

20

D3566-1 Manufactured No

200 Each

26.0000

2 2



Gasket



BR 11-10-18.

Location

Loc Qty

Loc Code

FP015

26

68924

2

72848

24

D3564-11 Manufactured No

200 Each

14.0000

1 1



Wearshoe



BR 11-10-18.

Location

Loc Qty

Loc Code

FP020

14

72207

14

D3564-13 Manufactured No

200 Each

9.0000

1 1



Wearshoe



BR 11-10-18.

Location

Loc Qty

Loc Code

FP016

3

69280

3

FP017

6

71594

6

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Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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Start Date: 8/23/2011

Required Date: 8/31/2011

Start Qty: 1.00

Required Qty: 1.00

D3564-9 Manufactured No

200 Each

15.0000

1

1



Wearshoe



BR 11-10-18.

Location

Loc Qty

Loc Code

FP019

73345.

5

67590

4

69943

1

FP020

10

72208

10

D3564-5 Manufactured No

200 Each

13.0000

1

1



Wearshoe



BR 11-10-18.

Location

Loc Qty

Loc Code

FG

73330.

2

34806

2

FP019

11

72164

11

D2594-3 Manufactured No

200 Each

564.0000

16

16



O-Ring, 205 Skidtube



BR 11-10-18.

Location

Loc Qty

Loc Code

FP-A

564

65518

41

66952

523

16.

W/O:		WORK ORDER CHANGES					
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Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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Required Date: 8/31/2011

Start Qty: 1.00

Required Qty: 1.00

D2594-1

Manufactured No

200

Each

258.0000

16

16



Plug, 205 Skidtube



BR 11-10-18.

Location

Loc Qty

Loc Code

16

FP-A

73401

258

42807

28

67441

7

68943

22

72127

201

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DART

DESIGN #	DRAWN BY RH	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
CHECKED #	APPROVED #	DRAWING NO. D2580	REV. D SHEET 1 OF 3
DATE 07.02.27		TITLE 205 SKIDTUBE ASSEMBLY	SCALE NTS
A	96.09.16	NEW ISSUE	
B	96.12.02	AS MANUFACTURED	
C	98.08.26	REDRAWN, INCLUDED DEO 9094/9097	
D	07.02.27	CHANGE TO SS WEARPLATES AND GASKETS, INCLUDE DEO 9124/9183	

RELEASED
07.06.28 #**DEO ATTACHED****UNDER REVIEW**P110630
RMV P11.06.30

QTY -041	QTY -045	Part Number	Description
X		D2580-041	SKIDTUBE ASSEMBLY
	X	D2580-045	SKIDTUBE ASSEMBLY
1	1	D2500-1-190	EXTRUSION
1	1	D2576-3	STEP
20	24	D2579	CROSS BOLT SPACER
16	16	D2594-1	PLUG
16	16	D2594-3	O-RING
1	1	D2596	205 WEB
1	1	D2855	AFT CAP
1	1	D3564-5	WEARSHOE
1	1	D3564-9	WEARSHOE
1	1	D3564-11	WEARSHOE
1	1	D3564-13	WEARSHOE
2	2	D3566-1	GASKET
1	1	D3566-5	GASKET
1	1	D3566-13	GASKET
50	50	ALS7-1032-130 or AKS7-1032-130 or AKS4-1032-130 or AELS-1032-130	INSERT
50	50	AN3C4A	BOLT
2	2	AN3-5A	BOLT
50	50	AN960C10L	WASHER
2	2	AN960JD10L	WASHER

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UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 72985

N12 88-23

GENERAL NOTES:

- 1) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED
- 2) ALL DIMENSIONS ARE IN INCHES
- 3) INSERT D2596 WEB TO LOCATION SHOWN OFF AFT END OF SKIDTUBE AND BOND WEB INTO OUTER TUBE WITH NON-STRUCTURAL SIKAFLEX-241 ADHESIVE PER DART QSI 015 BEFORE BENDING. ENSURE HOLES LINE-UP.
- 4) BEND AS A SMOOTH RADIUS STARTING WITH A MAXIMUM CENTERLINE RADIUS OF 60 AND ENDING WITH A MINIMUM RADIUS OF 30. A MAXIMUM REDUCTION OF 0.200 IN DIAMETER IS ALLOWABLE IN THE BENT PORTION OF THE TUBE.
- 5) USE DART DRILL TEMPLATE TD2577-205 TO LOCATE AND DRILL Ø0.297 HOLES FOR WEARSHOE INSERTS. INSTALL ALS7-1032-130 PER SECTION D-D (50 PLACES) AFTER FINISH. INSTALL AN3C4A BOLTS AND AN960C10L WASHERS WITH SIKAFLEX-241/-291.
- 6) WELDING TO BE DONE PER DART QSI 004.
- 7) FINISH:
SEE NOTES ON
PAGE 2 FOR D2580-041 AND
PAGE 3 FOR D2580-045
- 8) INSERT D2594-1 PLUG C/W D2594-3 O-RING IN HOLES MARKED 'P' (BOTH SIDES OF TUBE) AFTER FINISH (16 PLACES).

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CP 11.06.30
RMV CP. 2.4.3.

D2580-1 DRILLING DETAIL

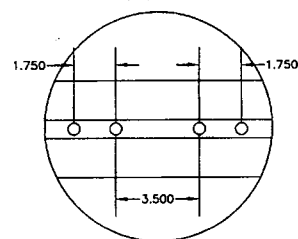


Diagram illustrating the grinding locations on a propeller cross-section:

- GRIND FLUSH (4 PLACES)
- GRIND FLUSH
- D2576-3 STEP
- GRIND FLUSH
- LOCATION RIDGE ON UNDERSIDE OF D2576
- GRIND FLUSH

RELEASED
07-06-28

~~DEO ATTACHED~~
RmV 4/11.06.30

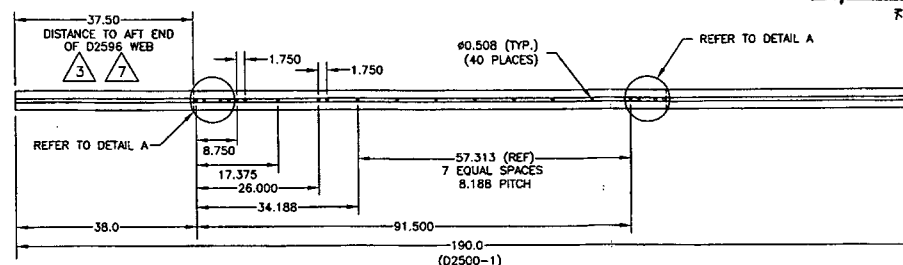
D2579 SPACER

D2596 WEB (REF)

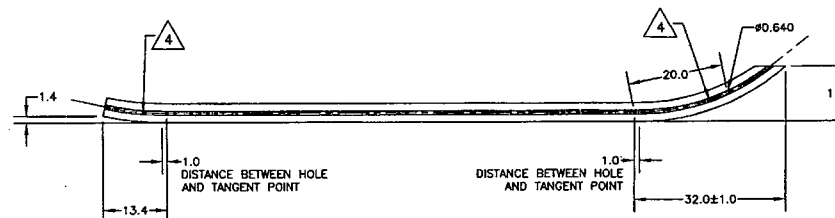
ALS7-1032-130 (REF)
(TYP 50 PLACES)

AFTER DRILLING AND BENDING ASSEMBLY
PERFORM THE FOLLOWING FOR #0.508 HOLES ONLY:

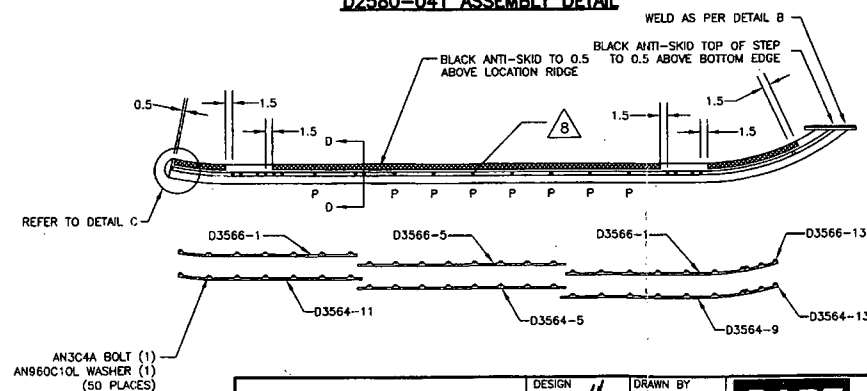
1. CHAMFER HOLE .050 X 45°
2. INSERT D2579 SPACER (20 PLACES)
3. WELD INTO PLACE AND GRIND FLUSH
4. CBORE D2579 SPACER TO #0.437 X 1.00 DEEP



D2580-1 BENDING AND CUTTING DETAIL



D2580-041 ASSEMBLY DETAIL



D2580-041 NOTES

- i) FINISH: ACID ETCH, ALODINE PER DART QSI 005 4.1 PRIOR TO INSERTING D2596 WEB POWDER COAT ASSEMBLY GLOSS WHITE (REF. 4.3.5.1) PER DART QSI 005 4.3 BLACK ANTI-SKID PAINT AS INDICATED PER DART QSI 005 4.4

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DESIGN

DRAWN BY

CHECKED

APPROVED

DATE _____

DART

DART AEROSPACE LTD.
HAWKESBURY, ONTARIO, CANADA

CHECKED ☒

DRAWING NO

REV. 0

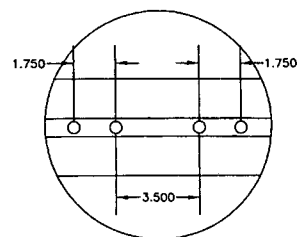
DATE
07.02.27

TITLE	205 SKIDTUBE ASSEMBLY
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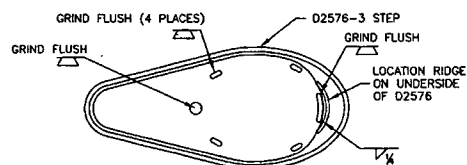
SCALE
1:24

RMV 11.06.30

D2580-1 DRILLING DETAIL



DETAIL F
SCALE 5:24

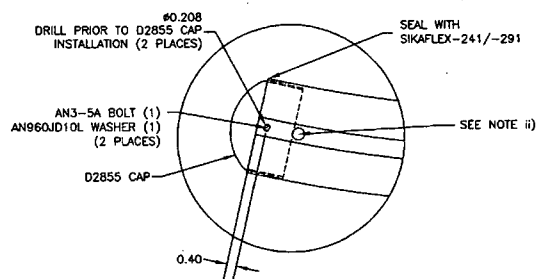


RELEASED
07-06-28

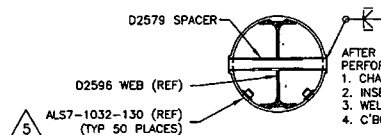
~~DEO ATTACHED~~

RMV CP# 06.30

DETAIL G
SCALE 5:24

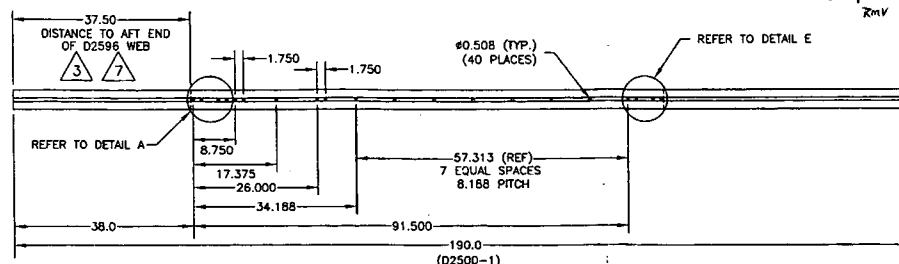


SECTION H-H
SCALE 5:24

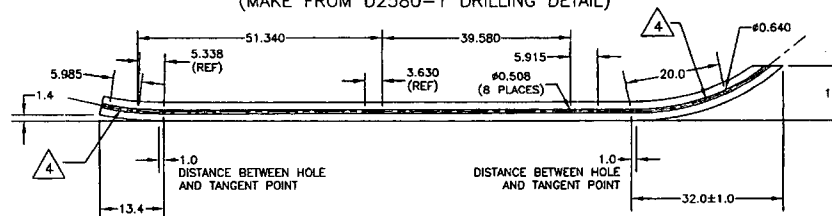


AFTER DRILLING AND BENDING ASSEMBLY
PERFORM THE FOLLOWING FOR Ø0.508 HOLES ONLY:

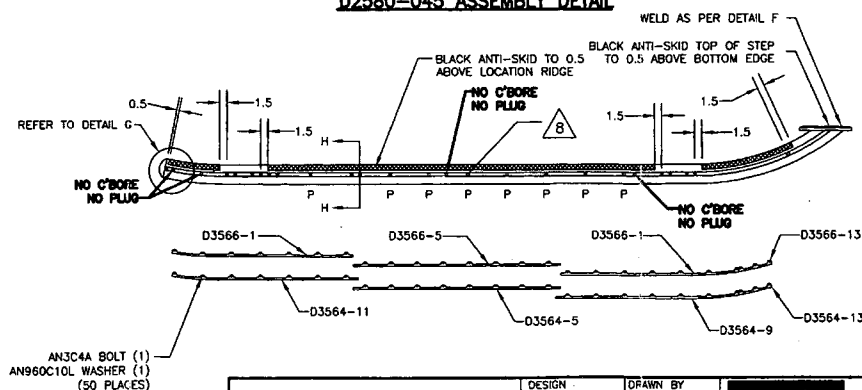
1. CHAMFER HOLE 0.050 X 45°
2. INSERT D2579 SPACER (20 PLACES)
3. WELD INTO PLACE AND GRIND FLUSH
4. C'BORE D2579 SPACER TO Ø0.437 X 1.00 DEEP



D2580-5 BENDING AND CUTTING DETAIL
(MAKE FROM D2580-1 DRILLING DETAIL)



D2580-045 ASSEMBLY DETAIL



D2580-045 NOTES

- i) FINISH: ACID ETCH, ALODINE PER DART QSI 005 4.1 PRIOR TO INSERTING D2596 WEB
POWDER COAT ENTIRE ASSEMBLY GREEN (REF. 4.3.5.8) PER DART QSI 005 4.3
BLACK ANTI-SKID PAINT AS INDICATED PER DART QSI 005 4.4
- ii) IT IS ACCEPTABLE TO GRIND A RELIEF IN THE D2855 AFT CAP TO PREVENT INTERFERENCE
WITH THE SPACER AT THIS LOCATION

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DESIGN

24

NO
CHECKED

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DATE _____

07.02.27

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D2580

TITLE	
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205 SKI

DART AEROSPACE LTD.
HAWKESBURY, ONTARIO, CANADA

PC

TABLE 2

SHEET 3

ASSEMBLY

NO. 271

AWS D17.1.2001
QUALIFICATION TEST RECORD

Name: Barclay Elliott
Job number: 72859
Part number: 1 205 - 634 - 041
Description: 205 Skid tube
Welding Process: Tig ☒ Mig ☐
Base material: Aluminium
Current: AC ☒ DC ☐

TEST REQUIREMENTS AND RESULTS

Visual: pass ☒ fail ☐
Penetration: pass ☒ fail ☐

UNACCEPTABLE

Cracks: pass ☒ fail ☐
Undercut: pass ☒ fail ☐
Pin holes: pass ☒ fail ☐
Overlap (cold lap): pass ☒ fail ☐
Porosity (surface): pass ☒ fail ☐
Coloration: pass ☒ fail ☐

Qualifier Pat Lum Date of Test Coupon 11-10-12
Welder Barclay Elliott Date of Test Coupon 11-10-12

The above named individual is qualified in accordance with AWS D17.1.2001 to weld